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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/663,266	09/16/2003	John Kevin Rote	TI-35799	1448

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EXAMINER

HABERMEHL, JAMES LEE

ART UNIT	PAPER NUMBER
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2651

DATE MAILED: 04/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/663,266

Applicant(s)

ROTE ET AL.

Examiner

James L Habermehl

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13-22 is/are allowed.
- 6) ☒ Claim(s) 1-3,5-10 and 12 is/are rejected.
- 7) ☒ Claim(s) 4 and 11 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

4.3

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1. This Office action is in response to application filed 16 September 2003, which papers have been placed of record in the file.

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-3 and 5-7 are rejected under 35 U.S.C. 102(e) as being anticipated by Brito et al. Brito et al. Figures 3-5 meet all the limitations of claim 1, including sampling actuator voltage (164), processing the sample for generating a digital voltage command (150), and applying the digital voltage command to control the actuator voltage (154).

Regarding claim 2, Brito et al. converts an analog actuator voltage into a digital actuator voltage sample signal (258/266/268).

Regarding claim 3, Brito et al. converts the digital voltage command into an analog voltage level (276/282).

Regarding claim 5, Brito et al. puts the actuator in a high impedance state (Figure 3 and FLOAT), waits for an actuator current to reach approximately zero (Figure 3 and 272), and thereafter samples the actuator voltage (Figure 3 and SAMPLE).

Regarding claim 6, Brito et al. calculates a velocity error and applies velocity error compensation to the digital voltage command (144).

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Regarding claim 7, Brito et al. shows subsequent to the applying step, waiting for a selected time and reiterating the sampling, processing, and applying steps (Figure 3 and 166).

4. Claims 8-10 and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Abe et al. Abe et al. Figure 5 meets all the limitations of claim 8, including sampling the actuator voltage (49), sampling the actuator current (48), calculating a BEMF using the samples (63/64) wherein the step of calculating BEMF is described by $BEMF = V_{mtr} - I_{mtr} \cdot R_{mtr}$ (Equation 2: $Bemf_h = V_s - R_m \cdot I_m$), calculating a velocity error using the BEMF and a target voltage ($Bemf_h / T_{bemf}$) wherein the step of calculating velocity error is described by $E_v = V_{tgt} - BEMF$ (shown at unnumbered summing junction with output = $T_{bemf} - Bemf_h$), producing a digital voltage command for compensating the actuator voltage for the velocity error (42), and applying a voltage at the actuator according to the digital command (across 52).

Regarding claim 12, Abe et al. col. 8, lines 18-19 show subsequent to the applying step waiting a selected time interval and reiterating the foregoing steps.

5. Claims 13-22 are allowed over the prior art of record. Claims 4 and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The following is a statement of reasons for the indication of allowable subject matter:

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Claim 4 is allowable over the prior art of record since the cited references taken individually or in combination fails to particularly disclose a method of controlling the actuator in a hard drive assembly comprising sampling the actuator voltage, processing an actuator voltage sample for generating a digital voltage command, and applying the digital voltage command to control the actuator voltage using pulse width modulation, as presented in the environment of claim 4. It is noted that the closest prior art, Brito et al., shows a method of controlling the actuator that samples the actuator voltage, processes the sample for generating a digital voltage command, and applies the digital voltage command to control the actuator voltage. However, Brito et al. fails to disclose that applying the digital voltage command further comprises using pulse width modulation as claimed.

Claim 11 is allowable over the prior art of record since the cited references taken individually or in combination fails to particularly disclose a method of controlling the actuator in a hard drive assembly comprising the digital voltage command is described by the formula as claimed, as presented in the environment of claim 11. It is noted that the closest prior art, Abe et al., shows a similar method of controlling the actuator in a hard drive assembly. However, Nishimura et al. fails to disclose the digital voltage command is described by the formula as claimed.

Claim 13 is allowable over the prior art of record since the cited references taken individually or in combination fails to particularly disclose a velocity-controlled actuator in a hard drive assembly comprising a digital processing engine for receiving a target actuator voltage command and the digital actuator motor voltage sample and for outputting a digital voltage command for controlling the actuator motor, as presented in

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the environment of claim 13. It is noted that the closest prior art, Brito et al., shows velocity-controlling the actuator by sampling the actuator voltage, processing the sample for generating a digital voltage command, and applying the digital voltage command to control the actuator voltage. However, Brito et al. fails to disclose a digital processing engine as claimed.

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hassan et al. Figures 4-6B and Brito Figures 3-8 show voltage control of the actuator using sampled actuator BEMF voltage similar to applicant's invention. Hill ('817) Figures 3-4 and 6, Hill ('901) Figures 3-5, and Carbolante et al. Figures 3-5 show PWM voltage control of the actuator similar to applicant's invention. Galbiati et al. Figures 2-3b and 5-6, Zayas et al. Figures 1-2 and 4 and Blank et al. Figures 2-6 show control of the actuator using sampled actuator BEMF voltage similar to applicant's invention.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James L Habermehl whose telephone number is (703)305-6975. The examiner can normally be reached on 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Hudspeth can be reached on (703)308-4825. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Habermehl/jlh
1 Apr 05



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SUPERVISORY PATENT EXAMINER
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